XV.—*Observations on the North-West Coast of Borneo.* By SPENCER ST. JOHN, Esq., F.R.G.S., H.B.M. Consul General for Borneo.

Read, March 10, 1862.

Physical and Political Geography of the districts lying between Gaya Bay and the Tampasuk River.

THE coast line, as viewed from the sea, presents the following appearance: Gaya Island and the shores of Gaya and Sapangar bays are hilly, and this continues to within a mile of the mouth of Mengkabong Harbour; the land there becomes flat, with the exception of the Tambalan Hill, as far as the mouth of the Sulaman Creek or river. High land then commences, which continues for a short distance beyond the Abai, when it again becomes low, and presents the same appearance for many miles beyond the Tampasuk River, the coast being fringed by casuarinas.

The mouths of the rivers Ananam, Kabatuan, Mengkabong, Tawaran, Sulaman, Abai, and Tampasuk, are all shallow and unfit for European vessels, the deepest having but nine feet at low water, and, with the exception of the Ananam, Kabatuan, and Abai, are much exposed during both monsoons, and are rendered dangerous by the numerous sandbanks that lie off their mouths. The Ananam in Gaya Bay, and the Kabatuan in Sapangar Bay, are only suited for native craft; the Abai has more water, and its mouth being sheltered, small vessels at certain times of tide might enter. Within, the water deepens to four fathoms, and is a perfectly landlocked harbour.

There are several bays along this coast which afford shelter for shipping. The finest of these harbours is that composed of the two bays Gaya and Sapangar, which is large enough to shelter, during both monsoons, every vessel that trades to the East. It contains within itself minor harbours, as one on the north-east of Gaya Island, which is deep (13 fathoms) and secure; and much fresh water may be obtained on its western shore. Lokporin, in Sapangar Bay, is also a safe anchorage, and is the proposed head-quarters of the Catholic mission. The portion of the bay opposite Gantisan, the Malay town, though good for shipping, is not so suited for small craft, as squalls from the south-west raise a heavy sea there. Numerous coral-reefs jut out from the northern shore. This harbour is the most important in Borneo, from its commanding position in the China seas, and from its great security.

Good shelter may also be found in Ambong and Usukan bays, but I have not entered them myself; the next, Abai, affords excellent shelter during both monsoons, though open to the north-west. It is, however, of inferior importance, though fresh water

Part of the

N.W. COAST OF BORNEO,

To illustrate the paper of

Spencer St. John Esq.

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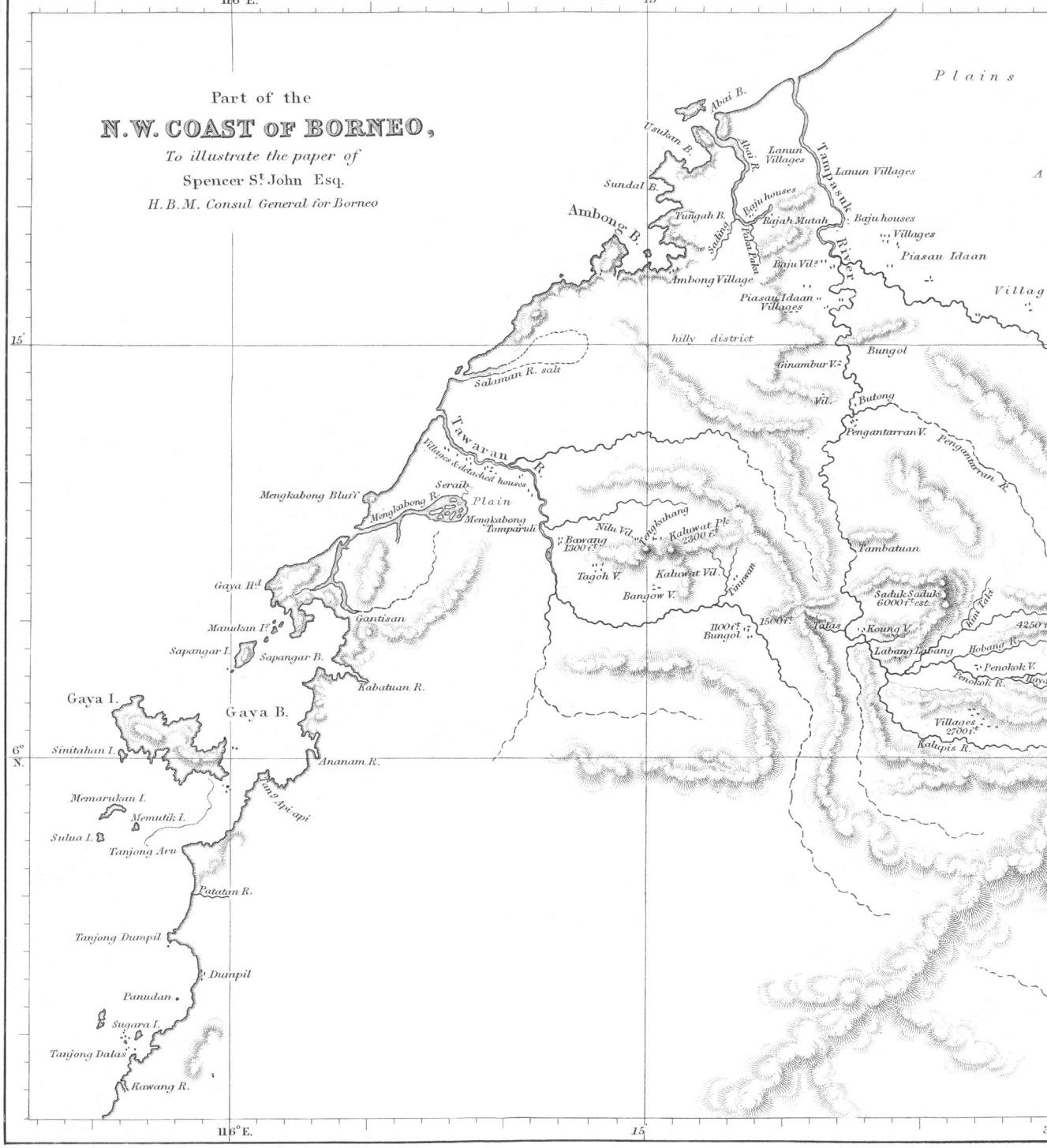

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may be obtained in small quantities on the grassy plain at the entrance to the river. Water is rarely absent where the land is hilly; wherever the country is low, and occasionally elsewhere, there are sandy beaches. The west end of Gaya Island, Gaya Head, and the headlands between Sulaman and Abai, are rocky: beyond these appeared broad sandy beaches.

Passing the coast-line, the country presents varied forms. The hills that surround Gaya Harbour are low, some cleared at the top, bearing at present a rank crop of grass; others have a reddish tint, from the ferruginous nature of the soil; the rest are covered with jungle. On entering the Kabatuan, the banks are lined with a narrow belt of mangrove; but the hills rise immediately at the back, and this character appears to extend far into the interior both of the Kabatuan and Mengkabong. From the latter river to the Sulaman stretches a plain, perhaps seven miles in width, varied by a few very low hills. The country changes here, and broken ranges extend to the Abai; hill and plain are there intermixed; but as soon as we approach the Tampasuk, the country opens, and for Borneo, an extensive plain spreads out, reaching to the foot of the Muludu mountains: it is, however, occasionally diversified by low undulating sandstone hills.

This level ground is admirably adapted for rice-cultivation, as it is grass-land without any jungle. On leaving these plains, ranges of hills commence, rising for the most part with great abruptness, presenting steep sides and narrow ridges, and running for the most part in an east and west direction. There are, however, exceptions to the above description: a few of the hills have easy slopes, and many of the ranges are connected by cross ranges, running north and south, particularly at the heads of valleys, where the waters of the different tributaries flow in opposite directions, to join their main rivers. The highest of the hills we measured was about 3000 feet. The ranges towards the interior are higher, and at the back of these are very lofty mountains, including Kina Balu (13,698 feet according to Sir Edward Belcher); Saduk Saduk, about 6000; and others, whose names we could not obtain, estimated at about 7000 feet. All the hills in these districts that we examined consisted of sandstone until we reached Kina Balu.

Kina Balu, the highest mountain in the Archipelago, deserves a more extended description than I, from my imperfect information, can give. I will briefly notice the attempts that have been made to ascend it. The first was made by the Hon. Hugh Low, the Colonial Treasurer of Labuan; this was in March, 1851, when everything connected with the mountain was unknown: the route, the natives, the difficulties, were all to be studied and discovered; and, as no Malay had ever penetrated there, the journey, it was

generally thought, would prove a failure. However, Mr. Low succeeded in his enterprise, and reached the summit, though he did not attempt to ascend the rocky peaks that spring for a few hundred feet above the extended top.

The next attempt was made in 1856 by Mr. Lobb, a naturalist; but the natives refused to assist him, and he was unable to advance beyond its foot.

Mr. Low often planned another ascent, but various circumstances prevented him until April, 1858. As I was desirous to examine those districts, I had much pleasure in joining him. We chose the route by the Tampasuk River. On reaching the mountain, I was obliged to ascend it alone, as Mr. Low had so injured his feet as to be unable to walk. I reached the summit of the southern peak, and was mortified to find that both the east and west peaks appeared higher. The barometer having been destroyed by a fall, we could not measure the mountain. In the following July we made another expedition, to examine the country between Gaya Bay and the mountain; and though we both succeeded in ascending to the summit, the height was not fixed, as another accident happened to our instruments. With regard to the height of the mountain, various opinions have been entertained; but until some one is fortunate enough to reach its summit with a couple of good barometers, I think we may rest contented with Sir E. Belcher's measurement by trigonometry: he makes it, as before stated, 13,698 feet. Mr. Low, on his first ascent, had a very inferior barometer, while during the last two trips we were provided with two magnificent barometers by Adie, which Mr. Low had procured especially for these trips; but unfortunate accidents rendered them nearly useless. However, sufficient observations were taken to show that the first barometer was incorrect; and though both inclined, during our first joint expedition, to place the height of the mountain at above 11,000 feet, the last makes us feel sure that we underrated the height. I am therefore inclined, from all the observations made, to think Belcher is correct.

The summit of Kina Balu consists of syenite granite, which is in many places so jointed as to give it the appearance of being stratified: about ten peaks spring from a line running from east to west, while about half a mile to the southward rises another detached peak. Between the latter and the western portion of the former is an open space like a broad terrace, with sloping sides, down which huge granite slabs are continually gliding. The southern peak presents a very different appearance, according to the point of view: from the terrace it is sharp, not above a yard in breadth; while, from the east and west, it appears quite rounded—this renders it tolerably easy of ascent. On three sides it is perpendicular, while on the south it presents no material diffi-

culty. Without careful barometrical observations it will be impossible to fix on the highest peak: from several views, the southern, the summit of which I gained during the April trip, appeared as high as the others; while from the terrace, both the east and west appeared higher by perhaps fifty feet. The western peak has a rounded appearance, but we failed to discover a way of ascending its summit. I reached to within forty feet, when it presented only perpendicular sides. It is gradually wearing away before atmospheric influences, its northern base being covered with huge stones that have fallen; the summit is still overhanging, and much of it apparently ready to topple over. Between the western and eastern peaks, on the edge of the cliffs that overlook deep chasms below, is a wall principally of huge granite rocks; some so perched on the other, that at first sight it appears the work of man—geologically explained, I suppose, by the wearing away of the softer portions of the rocks around. Some of the peaks present the appearance of a thumb, while others are massive, as those that rise on either side of the spot where Mr. Low, in 1851, left a bottle with some writing inside. I found it in 1858 undisturbed, and would not break it to read the paper, but left it there to satisfy the curiosity of future travellers, and as a record of him who first ascended Kina Balu.

The summit is above two miles in length, and I observed that, in descending to its north-west and east spurs, the rocks assume a perfectly serrated appearance. Kina Balu extends a long distance towards the north-east or E.N.E., its height varying perhaps from 10,000 to 11,000 feet: this is partially divided from the parent mountain by a deep chasm. From the top we did not see it; in fact, the mist generally obscured the view, leaving but patches visible. The summit of the mountain, as I have before observed, consists of syenite granite, but every here and there it is crossed by bands of a white rock. For about 3000 feet below the peaks there is but little vegetation; the face of granite sweeps steeply up at an angle of 37·5. In the gullies and other sheltered spots are thickets of flowering shrubs, principally rhododendrons, a few even extending to the face of the peaks, particularly in the bottle gully.

From what we observed, the summit of the mountain can only be reached by the way we followed; I mean that portion above 9000 feet: to that spot there is said to be another path. Kina Balu throws out on every side great shoulders or spurs, which have also their sub-spurs: the principal are the north-west, very steep; and the W.N.W., which subdivides. On the west face of the mountain there are but minor spurs, which leave 5000 feet of precipice above them; from the southward two huge spurs extend. On one is the village of Kiau; it springs from the left of the southern face, and after running south-west, turns to the west by west and subdivides.

The next spur that springs from the right of the southern face is in every respect the most important—it may be called, for the sake of distinction, the main spur; those to the left we could not fully observe, as we only saw them from above. The main spur runs at first to the south-west, for about five miles; it then preserves almost a s.s.w. direction for twenty miles, throwing off on either side many sub-spurs. A glance at the map will best explain this. This is the range that is observed from the sea, and gave the notion of a backbone to Borneo; but beyond these twenty-five miles it does not extend: in fact, mountain-ranges running to the east and west are distinctly visible; the first, at not a greater distance than twenty-six or twenty-seven miles, appears to cross close to the end of the main spur. If we were disappointed at not obtaining views from the summit, we were partially repaid by the clear view we had of the country lying to the south and south-east of Kina Balu. We were at an elevation of above 7000 feet on the main spur, and observed numerous mountain-ranges, whose bearings I will give:

High-peaked Mountain,		S. ½ E., estimated 8000 feet.
Ditto	ditto	S.E. by E., estimated 7000 feet.
Ditto	ditto	S.E. by 2½ E., estimated 7000 feet.
A Peak		S.E. ¾ E., very distant.
A long-range Peak ..		S.E. ditto ditto.

The two very distant ranges are stated to be in the Kina Batangan country. Between us and the mountains bearing south-east by east (18 miles estimated) there was a grassy plain, perhaps three miles by two, on which were many villages: through this flowed a fair-sized river. We could trace its course as far as the third spur that springs from the main one; there a line of hills appeared to obstruct it, but beyond we could trace the course of a stream, which is probably its source. This river, it was stated by the people of the country, flowed into the lake of Kina Balu: it runs from the south-west to the north-east. With the exception of the plain above mentioned, and a marsh whose commencement we could observe north-east of the plain, all the country appeared hilly, and most of the land was cleared, and either under cultivation or showed the remains of former plantations. We could observe in the second valley two villages,—the first called Tu-han, the next Inserban: at both cotton is said to be cultivated. Many villages and detached houses were also observed, whose names our guides had forgotten. The route to the lake is by the above-mentioned villages; the names of those beyond are Penusub, Tambian, Paka, and Koporingan: these are stated to be on the route or close to the lake. A few words concerning this lake. That it exists to the east of the mountain appears from inquiry to be certain; its size it is unnecessary to estimate, though our

informant stated that, standing on one bank, it was not possible to see the opposite one: it cannot, however, be of the great size marked in the old maps, nor in the situation assigned to it, as the whole country from E.S.E. to the western coast was distinctly visible, and the Idaan expressly stated that it was farther to the north and east of the plain. I have before noticed, Mr. Low made many inquiries during our first trip, and we jointly questioned the Idaan on many occasions during our long stay at the Kiau village: they spoke of it as a certainty, many affirming that they themselves had been on trading expeditions to it. Petermann's map is entirely incorrect as to the position of the lake.

I must now make a few remarks on the vegetation that covers the mountain. Cultivation extends in a few places to the height of 3000 feet, but beyond that there is a fine jungle on the main spur to 6000 feet; it then commences to degenerate, and in the exposed portion of the ridge the trees are bent across the path, inferior in size and covered with moss; but above this height, in sheltered spots, the trees again increased in size. Above 7000 feet there were few fine trees, the vegetation changing its character, most of it consisting of flowering shrubs, ranging in height from ten to twenty feet; the trees, however, on the sides of the spurs continued of comparatively a large size until we had passed 9000 feet; at 10,000 the shrubbery became very straggling, and above that it was only scattered among the granite rocks. On the W.N.W. spur, called the Marei Parei, the vegetation even at 4500 feet was exceedingly stunted in many places, while above, in equally exposed situations, the jungle was of fair size; probably the nature of the soil may account for it, being formed of decomposed serpentine, containing much peroxide of iron.

Kina Balu appears to be the seat of the pitcher-plant, Mr. Low having made a magnificent collection,—some, perhaps, the most beautiful in the world. I will not enter on the botany, but refer to Mr. Low's account of his ascent in 1851, published in 1852 in the Journal of the Indian Archipelago, vol. vi. (very incorrectly printed). This, however, does not contain a description of all the pitcher-plants, as he was fortunate enough to find some new species during the last trip: one pitcher was large enough to receive the contents of two beer-bottles; another was 19 inches in length.

At the risk of repeating myself, I will make a few observations on each of the rivers that drain those districts. I have already remarked that the shallowness of their mouths renders them unfit for European commerce; the same remark might be extended, as the fresh water-streams soon become mere mountain-torrents. The Ananam I have not ascended; the Kabatuan is apparently a collection of salt-water creeks with a few fresh-water rivulets. The former town of Menggatal was situated about three miles up,

and only at flood-tide would float a frigate-barge; near the town the banks were grassy, and many cocoanuts were grown in the neighbourhood.

The Mengkabong also can scarcely be called a river,—it is rather a large salt-water lake with numerous islands, some containing hills of perhaps 500 feet in height: it is very shallow, many portions of it being dry at low tide, while others have but a few inches of water; it appears to be filling up very fast, and this, perhaps, affords a clue to the cause of the formation of the plains that extend beyond, which all appear to be composed of alluvial deposits. Many fresh-water rivulets drain the neighbouring hills, and pour their waters into this creek, but it is always salt: it extends perhaps for about five or six miles into the interior.

The Sulaman I have not entered, but I have seen it from the hills on many occasions; it presents the appearance of a lake, and is represented to be a salt-water creek. We could observe, by the rivulets that drained into the Tawaran, that the Sulaman has no interior.

The Tawaran, on the contrary, is a fresh-water river, even to its mouth, the flood-tides making but a slight impression on it. Large native prahus can safely ascend it for six miles; after that it depends on the state of the weather, rising and falling very rapidly, as it is influenced by the rains. The banks of the river as far as Bawang village are flat; there the hills commence, and, three miles beyond, the Tawaran divides into two branches,—one comes from the south, the other from the E.N.E. They immediately degenerate into mountain-torrents, and are then not used by boats: produce is occasionally brought down on rafts, but at some risk. Every range of hills affords the parent-stream a rivulet, but the Tawaran does not penetrate far into the country: its sources are apparently in the main spur of Kina Balu,—the east branch rising between the second and third sub-spur on the western side of the main spur; the southern branch appears very small. On both occasions that I passed the Tawaran it was of a dirty yellow colour, being filled with the detritus of the neighbouring hills. Land-slips are very common, and bring down a considerable amount of matter for the waters to carry seaward. The Tawaran is subject to very sudden inundations, the water occasionally reaching the houses at the village of Bungol, though, perhaps, fifty feet above the stream. There is no foundation for Dalrymple's story, which has been often repeated, of the Tawaran rising in the lake; it evidently has its source in the main spur of Kina Balu.

The Abai is a salt-water creek, but preserving more the appearance of a river; much of both banks are mangrove until we approach the houses. Its depth varies: on the bar it has but one fathom, while inside it deepens to four, and it has a channel

to the houses of about two fathoms. It is a favourite anchorage for native prahus, being admirably adapted for them. Two small rivulets join the Abai,—the Gading and the Paka Paka, both inhabited by the Idaan.

The Tampasuk is essentially a fresh-water river, very similar to the Tawaran, of no importance to European vessels : it differs from the Tawaran in having occasionally immense granite boulders in the stream, while the latter drains only a sandstone country; but, like the Tawaran, it divides into two branches,—the eastern one drains the northern portion of Kina Balu. We could observe its direction for above ten miles as it ran through the low lands; its course was E.S.E. from the junction. The Pengatarran, that drains a portion of the north-west of Kina Balu, bringing down innumerable blocks of serpentine, is the only other stream worth noticing. The natives seldom make use of the Tampasuk beyond the spot where the river divides, though above it rafts are occasionally used; but it evidently is not generally a practice, as the river is fitted with fish-traps, which require the stream to be dammed up across with loose stone walls. The hills do not press closely to the river's bank: if they do so on one side, the other is certain to have a slip of low land, along which the path is carried; in fact, from the sea to Koung village there is but one steep hill to cross: sometimes there are small plains that skirt the banks, at others gently sloping fields. The steep hills commence a few miles below Koung, on the left bank, and continue, with few exceptions, to the base of Kina Balu; the village of Labang-Labang, on a spur of Saduk-Saduk, has an easy slope from Koung, while toward the great mountain it is very steep. Near Labang-Labang the river divides and assumes different names: the principal branch is called the Kalupis, the other the Dahombang or Hobang; this receives the Kini Taki and the Penokok. Between the Hobang and Penokok streams is a sort of table-land, about a couple of miles across by perhaps four in length; it is not absolutely flat, but the ground swells very gently. The Kalupis has its source at the very summit of the hill, and we could trace its course from an inch deep, till, collecting all the drainage of the top, it dashed past our resting-place (at 9000 feet) a fair-sized mountain-torrent. About 1000 feet below, at the head of the Kalupis valley, it throws itself over the rocks, forming a pretty cascade of perhaps 1500 feet in height.

Having noticed the principal features connected with the physical geography, I will add a few notes on what Mr. Hamilton correctly calls Political Geography.

The population of these districts consists principally of three classes,—the Lanuns, the Bajus, and the Idaan or Dusuns.

The Lanuns were formerly numerous, having populous settlements on the Tawaran and Tampasuk, as well as on the Pandasan

and Layer Layer, farther north. They originally came from the large island of Mindanao, which is considered the most southern island of the Philippine groups: they have formed settlements on various points as convenient piratical stations, particularly on the east coast at Tungku, &c. Not only did they pirate by sea, but they created an unappeasable feud with the Idaan by stealing their children. No race in the Archipelago equals the Lanun in courage: it was therefore useless for the Idaan to make regular attacks; but they hung about the villages, and, by destroying small parties, teased the Lanuns out of Tawaran; they then joined their countrymen at Tampasuk. Sir T. Cochrane attacked both Pandasan and Tampasuk, which induced the most piratical portion to retire to the east coast. At present but few remain in Tampasuk: they are not considered to have more than 150 fighting-men. They are essentially strangers and unpopular; they seldom form regular governments, but attach themselves to certain chiefs, who give themselves high-sounding titles, particularly those of Sultan and Rajah. These chiefs are independent of each other, and unite only for defence, or for an extensive expedition: they are gradually leaving these districts. Although Mahomedans, their women are not shut up: on the contrary, they freely mix with the men, and even join in public deliberations; they are said to be tolerably good-looking. The men I have seen are better featured than the Malays or Bajus.

The Bajus are scattered along the coast, their principal settlements being at Mengkabong and Tampasuk. At Mengkabong they appear numerous, and, perhaps, could muster 1000 fighting-men; at Tampasuk they estimate their own numbers at 600 men; at Pandasan, 400; at Abai, Sulaman, and Ambong, there are a few. Their origin is involved in obscurity; they are evidently strangers; they principally occupy themselves with fishing, manufacturing salt, and with petty trade. Some breed cows, horses, and goats, while a few plant padi and have small gardens. They profess the Islam religion, and keep the fast with some strictness, but are probably little acquainted with its tenets. No one can accuse the Bajus of being a handsome race: they have generally pinched-up small faces, low foreheads, but bright eyes. The men are short and slight, but very active: the women have a similar appearance to the men, and are slighter than Malay women; they wear their hair tied in a knot on the top of the head, which is very unbecoming; they have greater liberty than among the Malays, and came and sat near us and conversed a little. We saw many men that differed totally from my description; but on inquiry we found they were of mixed breed: one of mixed Baju, Lanun, Malay, and Chinese; the next, Baju, Sulu, Lanun, and Malay. In fact many intermarry, which makes it difficult to give a par-

ticular type for one race. The Bajus of Tampasuk nominally acknowledge a Datu as their chief, who receives his authority from Brunei; but they never pay taxes to the supreme government, and seldom send even a present. They are individually very independent, and render no obedience to their chief unless it suits their own convenience. They are therefore disunited, and unable to make head against the few Lanuns with whom they have continual quarrels. Every man goes armed, and seldom walks; if he cannot procure a pony, he rides a cow or a buffalo, the latter generally carrying double: their arms consist of a spear, shield, and sword. Their houses are similar to the Malays', being built on posts, sometimes in the water, sometimes on dry land; in Mengkabong they are in the water, and are very poor specimens of leaf-huts. The Tampasuk not affording water-accommodation, the houses are built on shore: the only good one was the Datu's, which consisted of a planked house of two stories: the lower story, occupied by the married portion of the family, consisted of one large room with broad inclosed verandahs; the upper story was for the young unmarried girls and children. Of furniture there is little; mats, boxes, cooking-utensils, and bed-places being the principal. In these countries there are no public buildings; no offices, jails or hospitals, nor even a fort or stockade. The houses being built of temporary materials, there are no ancient buildings of any description.

Mixed with the Bajus are a few Borneans: in Gantisan they form the bulk of the village; in Mengkabong they are not numerous, while in the northern districts there are few, if any, strangers. An occasional Indian, Sidi, or Chinaman may be seen; but they are only petty traders, and return to Labuan after a short residence.

The principal inhabitants of these districts consist of the Idaan* or Dusun, the aboriginal population: they are essentially the same in appearance as the Dyak, the Kayan, the Murut, and the Bisaya; their houses, dress, and manners are very similar, modified of course by circumstances. In the Kabatuan, Mengkabong, Sulaman, and Abai, are some tribes of Idaan, but I have not visited their villages; I shall therefore confine myself to those I observed on the Tawaran and Tampasuk.

On the banks of the Tawaran, where it flows through the plain, are many villages of Idaan, which are completely hidden by groves of fruit-trees; these men have a civilized appearance, wearing jackets and trowsers. As you advance into the interior, the clothes lessen; at Kiau there are but few to be seen, and beyond they are said to use only the bark of trees. Some of the tribes on the Tawaran have followed the Malay fashion of living in small houses suitable for a

* Idaan is the name given them by the Bajus, Dusun by the Borneans.

single family, while others occupy the usual long house, with the broad verandah, and separate rooms only for the families. The house at which we lodged at Ginambur, on the Tampasuk, was the best I have ever seen among the aborigines: it was boarded with finely-worked planks; the doors strong and excellently made, each also having a small opening for the dogs to go in and out; the flooring of bamboos beaten out was very neat, and free from all dirt, which I have never before noticed in a Dyak house, where the dogs render everything filthy. The Ginambur Idaan are good specimens of the aborigines: they are free from disease, and are clean-skinned; they have good-tempered countenances; none of the women are good-looking, still they are not ugly; all the girls and young women wear a piece of cloth to conceal their bosoms,—it was upheld by strips of coloured rattans; their petticoats were also longer than usual; the very young girls had the front of the head shaved. I did not notice that any of the men of that village were tatooed, but in our walk we had met parties of Idaan from the interior who were so; a tatooed band two inches broad stretched in an arc from each shoulder, meeting on their stomachs, then turning off to their hips: some of them had the band prolonged from the shoulder to the wrist. Many of their villages are extensive, as Koung, which is large and scattered about a grassy plain, and many houses also on the hill above: it is a very pretty spot, the greensward stretching on either side of the river's bank, where their buffaloes and cattle graze. This tribe has the appearance of being rich: they possess abundance of cattle, pigs, fowls, rice, and vegetables, while the river affords them fish. Kiau is also an extensive village, but the houses and the people are very dirty; on our first visit they were all suffering from colds, which rendered them unpleasant neighbours.

None of the Idaan pay any tribute, though many chiefs on the coast call them their people; but it is merely nominal, no one daring to oppress them: each village is a separate government, and almost each house independent. They have no regular chief, but follow the counsels of the old men to whom they are related: they have no wars to induce them to unite more closely; their feuds are but petty quarrels, and in but one house did I observe heads, and that was at the village of Tamparuli, in the Tawaran plain. The very fact of troops of girls working in the fields without male protection would prove the security that exists, though every man always walks armed. We had no opportunity of observing any of their ceremonies, and it is very unsafe to trust to the information of interpreters.

The aborigines in general are so honest that but little notice is taken of this good quality; however, to our surprise, we found that some of these Idaan were not to be trusted: we were warned

by the Bajus to take care of our things, yet we felt no distrust; but at Kiau they proved their thievish qualities, which, however, we frightened out of them, as during our second residence we lost nothing there. At the village of Nilu they made an attempt, which we checked at once.

The Idaan are essentially agriculturists, and raise rice, sweet-potatoes, the kiladi, an esculent root, yams, Indian corn, sugar-cane, tobacco, and cotton: the sugar-cane is only raised for eating in its natural state, while the cotton is confined to certain districts. I first saw the natives ploughing in the Tampasuk: their plough is very simple, and is constructed entirely of wood; it serves rather to scratch the land than really to turn it over. The plough was drawn by a buffalo, and its action was the same as if a pointed stick had been dragged through the land to the depth of about four inches: after ploughing, they use a rough harrow. In the Tawaran they ploughed better, the earth being partially turned over to the depth of about six inches. The Idaan have divided the land into square fields, with narrow banks between them; each division is as much private property as English land, and is considered very valuable; the banks keep in the water: their crops are said to be very plentiful. Simple as this agriculture is, it is superior to anything that exists south of Brunei, and it would be curious to investigate the causes that have rendered this small portion of Borneo, between the capital and Maludu Bay, so superior in agriculture to the rest: I think it is obviously a remnant of Chinese civilization. Pepper is not grown north of Gaya Bay, and is confined to the districts between it and the capital. The Idaan use a species of sledge drawn by buffaloes to take their heavy goods to market. The gardens in the Tawaran are neatly kept and neatly fenced in. On the hills the plough is not used, and there the agriculture presents nothing remarkable beyond the great care in keeping the crop free from weeds; the tobacco is well attended to, and these districts supply the whole coast, none being imported from abroad. When carefully cured, the flavour is considered as good, and the cultivation could be easily extended.

Of the cotton I can say little, as I did not find that any of these tribes cultivated it, though they assured me that they purchased their supplies from villages nearer the lake. The Tuhan and Inserban districts produced it, they said, in considerable quantities; and I observed the women in several places spinning yarn from the cotton. The Bajus of Tampasuk obtain their supplies from a tribe near Maludu Bay.

Among the hills, the implements of agriculture consist of simply a parang or chopper, and a biliong or native axe; the ground is therefore no more turned up than what can be effected by a pointed

stick; in fact, the steepness of the valley sides is against an improved agriculture: it is better adapted for coffee. Mr. Low, who has much experience, pronounces the soil—a rich orange loam—to be superior to that of Ceylon; and Kina Balu being but twenty-five miles from the port, there are great advantages here: the plains are alluvial, and very fertile.

With regard to the amount of population, all estimates would be mere guess-work; but the population must be considerable, as little old jungle remains, except on the summits of lofty hills, the rest being either under cultivation or lying fallow, with brushwood upon it. The tribes on the Tampasuk estimated their own numbers at 5000 fighting-men; the Tawaran tribes are equally numerous; but, reducing that estimate, and putting together the various information received, I should be disposed to place the entire population of these districts at 40,000 people: this is, perhaps, rather under than over the amount.

The 5000 fighting-men that are stated by the Idaan to live on the Tampasuk are, they say, thus divided:—

The Piasau Idaan, 500; Ginambur, 1000; Bungol, 1000; Koung, 500; Kiau, 2000. Total 5000 men.

It is impossible to verify this statement, but we may test it slightly by the observations made. The Piasau Idaan, so named from the extensive groves of cocoanut-trees that surround their villages (*piasau*, a cocoanut), are spread over the Tampasuk plain, and I think I am understating when I say we noticed above fifteen villages: I should have placed their numbers much higher than 500. The Ginambur was a large village, and there was another of the same Idaan about a mile off, among the hills, which I passed through. Bungol is also stated at 1000 men: our Malays, who visited it, said that it was very large, while the extensive villages of Sambatuan, of Pengantaran, of Batong, with numerous others on the hills and on the left-hand branch, have to be included in the Ginambur and Bungol tribes. Koung is placed at 500, which is not a high estimate, there being above 300 families in the village. Kiau is stated to contain 2000 fighting-men: in this number are included the village of Penokok (small); of Labang-Labang (large); of Sayap, which we did not see. I should be inclined to reduce the Kiaus by 500 men, though we understood them to say that their tribe was numerous beyond the north-west spur, in the neighbourhood of Sayap.

I think we shall not be over-estimating the population by placing it at 4000 fighting-men, or 16,000 inhabitants. Rejecting the women and the children, both male and female, one in four may be taken as the combatants. There are many villages on the eastern branch, and populous, as the clearings showed. I may make

this observation, the result of many years' experience, that I have seldom found the statements of the natives with regard to population above the truth. In Sarawak and the neighbouring countries, where we had better means of ascertaining the correctness of the accounts rendered, we have always found it necessary to add a third to the numbers stated.

The Tawaran contains a population equal, or but little inferior, to that of the Tampasuk. The villages between the mouth and Bawang are numerous, but much concealed by groves of fruit-trees. Tamparuli was an extensive village, and Bawang of fair size. The Nilu tribe was scattered over the sides of the hills. Kalawat was a village of perhaps 80 families; Bungol contains about 150 families; the Tagow, Bangan, and other villages were observed on sub-spurs; and beyond Bungol the tribes must be numerous, if we may judge from the extensive fires made by them to clear their plantations. On the right-hand branch are also many villages; but we had no opportunity of examining them. Of the western branch I know nothing personally. By native accounts, the Tawaran is more populous than the Tampasuk.

Of Ananam I know nothing; of Kabatuan I saw little, beyond the Malay town; but I was informed that the Idaan were numerous in the interior of this river, as well as on the hills that surround Mengkabong. I have placed them at 500 men, or 2000, which is not a high estimate. Mengkabong contains also an extensive Baju population; and in estimating them at 6000, it is, I believe, much below the number: the villages are numerous, and the chief town large. It is possible that there are not more than 1000 fighting-men; but the Bajus are holders of slaves, and there are also many strangers settled among them.

Sulaman is placed at 1000, which includes both Baju and Idaan, and may be a little over the mark: for it I have nothing but vague native testimony.

Abai contains about thirty houses, perhaps not above 200 people; while in the hills are a few small villages of Idaan. I have put them at 125 men, or 500 in all.

Tampasuk contains about 150 Lanuns, or 750 population; Bajus, perhaps, 500, or 2500 people—they say, 600 men. I have multiplied the Lanun and Baju fighting-men by five, as they have many slaves, both male and female.

Gaya Bay contains about 300 people. The population of these districts may, therefore, be entered as follows:—

Gaya Bay, 300 Malays and others; Kabatuan, 1000 Idaan; Mengkabong, 6000 Bajus and others, and 1000 Idaan; Tawaran, 16,000 Idaan; Sulaman, 1000 Idaan and Bajus; Abai, 200 Bajus, and 500 Idaan; Tampasuk, 2500 Bajus, 750 Lanuns, and 16,000 Idaan. Total 45,250.

The only figures in the above which I think may possibly be

overstated are the Bajus of Tampasuk. Allowing for that, we may fairly reckon the population of the districts between Gaya Bay and Tampasuk at 40,000: being quite aware, at the same time, that this estimate is founded on very loose data; but it may serve as a guide to future inquirers.

There are but trifling manufactures carried on. The Bajus are much occupied in preparing salt for the inland tribes. This article is manufactured by burning the wood of the Nipa palm: the residue is then thrown into water, when the ashes are separated from the saline matter; the water is then boiled, and a coarse bitter salt is the result. It is not disagreeable, after a little use; and I prefer it to the coarse salt of Siam, in the state that the latter is usually sold. Very little salt is imported even at the capital, except for the purpose of curing fish.

The only other manufacture that is worth noticing is that of cloth from native cotton. The most esteemed cloths are those of the Lanuns. The cloth is generally black, with a few white lines running through it, forming a sort of check: it is strong, more durable than any other I have seen, and fetches a high price, varying from 5 to 10 dols. for a piece sufficient for a single dress. They are, however, deteriorating, since the introduction of cheap English yarn, which is superseding the carefully-spun native. No minerals have, as yet, been discovered in these districts beyond the coal in Gaya Island, though tin has been found to the north of Kina Balu, near one of the streams flowing into Maludu Bay.

There is but little trade carried on; the only articles of export are tobacco, rice, a little wax, cattle and horses, or rather ponies. The imports consist of cloths, iron, cheap earthenware, gongs, and occasionally a valuable jar. These jars, of ancient workmanship, fetch high prices, varying from 5*l.* to 500*l.* Little beyond tobacco is brought from the interior, as everything is carried on men's shoulders, none of their paths being as yet suited for loaded beasts. When Mr. Low visited Kiau, in 1851, beads and brass-wire were eagerly received; and though they took his cloth, it was not much prized. In April, 1858, we were advised to take wire and cloth; beads were quite at a discount. Having obtained the cloths at easy rates, their services being paid for in it, they in the following July cared for little else, all being eager to obtain trowsers, previously a bark chawat being their only cover. The Bajus ask such high prices for all cloths, that it places them almost beyond the reach of the aborigines.

A little trait of the women shows them an improvable people. I have noticed how dirty they were. On the last occasion we stayed fifteen days in their houses, and they were very attentive to

all our movements; they observed us bathing every day, and using our brushes and combs. We had brought some looking-glasses, and we promised one to a young girl, if she would go and wash her face: having done so, she received her present. The looking-glass showed them what dirty faces they had, and its effect was soon apparent: all the girls began washing, and those who were not fortunate enough to have one given them were eager to exchange looking-glasses for fowls. They begged us, when we came again, to bring them cloth, looking-glasses, combs, and needles.

It is a great drawback to this country having no navigable rivers; nor on the hills have they good paths. The latter are easily made, the country presenting no natural difficulties; while on the plains, very fair paths already exist, fit for sledges. The tribes in the interior are at present far beyond any commerce; in fact, the people near the lake have never been visited by the coast population, and trust to exchanging with the other Idaan.

With respect to the language spoken, I will at present make but few remarks: the languages of the Lanun and Baju are entirely different from the Idaan. I have made several vocabularies and many inquiries at Kiau; we collected there about 500 words; at Blimbing on the Limbang 300 Bisay; and whilst in Maludu Bay seven years ago, I made a short list. These three agree so far, that I may say that the Idaan and Bisaya have two out of three words in common; and, on further inquiry, I think that the remaining one-third will gradually dwindle away, as at present many words in my Bisaya vocabulary are Malay, for which they have their native words. The result of our inquiries is, that all the Idaan speak the same language, with differences. We found the tribes on the Tampasuk and Tawaran spoke fluently to each other; and one of our interpreters, who had never before visited these countries, but had been accustomed to the aborigines to the southward of Gaya, conversed freely with them. The Bisaya live on the rivers in the neighbourhood of the capital, and their language differs but little from the Idaan. I will reserve my notes on the aboriginal languages, and only add that the Idaan contains but few Malay words: these generally refer to imported articles and domestic animals; some are similar to those of the land Dyaks of Sarawak.

I will add a few remarks on the geology of these districts, premising them, however, with the observation that I am quite ignorant of the science. Wherever the rocks protruded through the hills, we noticed they were decomposing sandstone; and this character continued until we reached the great mountain. Occasionally, as in Gaya Island, the rocks were of a harder texture, and here a

Mr. Motley is said to have discovered a vein of coal. In the districts to the west and south of Tampasuk we noticed no signs of primitive rocks, while in the Tampasuk River huge boulders of granite are met with a little above Batang, while the *débris* extends as far as the junction; but the rocks of the hills are sandstone, and this character continues to the base of the mountain. At Koung the rocks dipped to the south-west by south at an angle of 45°. On the Marei Parei spur we could trace the sandstone to the height of about 4000 feet, the dip about 80° to the south-west; greenstone immediately after protruded, and appeared to form the chief rock. On the Marei Parei spur the compass was so affected by the peroxide of iron which formed a sort of coating to the rocks, that it would not act. The main spur consists at first of sandstone, then of black shale, almost as hard as rock; of various rocks I do not recognize; then of decomposing granite, above which commences the massive outline of the summit. I have preserved specimens of the rocks in the order found, so that a geologist may be able to affix their names; the only one to which I have not affixed a number, is a piece of limestone that was broken off somewhere near the base of the mountain in the Kalupis valley.

The country presents the appearance of having been originally of sedimentary rocks, through which the granite has found its way, upheaving the sandstone to an angle of 80°.

With regard to the climate I make a few notes. The plain and low hills are much the same as the rest of Borneo, or other tropical countries; but in the neighbourhood of Kina Balu it is of course different. We found at the village of Kiau that the thermometer never marked above 77° during the day in a house about 3000 feet above the sea, and varied from 66° to 69° during the various nights: the mean of the observations gave a shade below 68°. The Marei Parei spur offers a fine position for a sanitarium at about 5000 feet; our tent was pitched at about 4700 feet, and we found that the thermometer marked 76° (mean) mid-day, 60° at 6 A.M., and 56° (mean) at 6 P.M. This would be a delightful climate in a well-built house. The cave at 9000 feet was very cold,—at 2 P.M., 52° (mean); and during the three nights I slept there in May, it was 40° 33′ (mean), ranging between 36° 5′ and 43°. During the last trip in July, in the cave, the thermometer marked, at 6·30 A.M., 43°; 9·15 A.M., 48°; 3·30 P.M., 51·250°; 6 P.M., 45·750°; registering thermometer, 41·125° (mean) at night. On the summit at 1 P.M., exposed to mist and rain, it marked 52°; while, exposed to a strong wind, and a storm of sleet and hail, it fell to 43° at 2 P.M. On a fine day it marked 62° at 12 mid-day in the shade, there being much refraction from the rocks.

I must add a few remarks on the rough map that accompanies

this paper. The coast-line is taken from the Admiralty chart, while the interior I have filled up from our observations and rough plans made on the spot. It may afford some idea of the country, and serve until some one, with greater advantages, makes a better.

Brunei, November, 1858.

XVI.—*Surface Currents of the Bay of Bengal during the South-West Monsoon.* By J. A. HEATHCOTE, Esq., I.N.

Read, April 28, 1862.

THE subject of ocean currents is one in which the Royal Geographical Society has always taken a deep interest, both on account of its intimate connection with the science to which this Society particularly devotes itself, and also from its immediate practical utility. Much benefit has already accrued to navigation and commerce from the study of the circulation of the surface currents of the ocean; yet much remains to be done in the same direction, and with a promise of equally beneficial results.

The section of this subject to which I have particularly applied myself is the Bay of Bengal. Surrounded as that Bay is by the centres of trade of the various provinces on its shores—Akyab, Rangoon, Moulmein, and Penang on the east; the naval station of Trincomalee, Madras and several smaller ports in the same Presidency, and Calcutta on the west; all these places having constant intercommunication between themselves, and also with the countries of Europe, with China, and with America—the importance of this sea as a great highway of commercial traffic particularly recommends it to attention, while my own connection with it on surveying duties gave me a special interest in it, and moreover it gave opportunities of ascertaining facts, collecting information, and observing effects which have been of material assistance in prosecuting the subject of this paper.

The Bay of Bengal has not hitherto had that particular attention paid to it which must be necessary before any true determination of existing ocean currents can be arrived at. Horsburgh has given a short general account of these currents, but he omits details,—indeed he had not the opportunity of ascertaining them. He gave valuable information and the best that could be obtained at the time he wrote, but some of his statements are merely deductions by analogy, and it is not to be wondered at that experience has proved him to be sometimes, though not often, in error. Horsburgh having been the only available authority, he has been made use of wherever physical geographers of this or other countries, in elucidating the general set of the main currents